

# PATENT ABSTRACTS OF JAPAN

(11)Publication number : 01-227279

(43)Date of publication of application : 11.09.1989

(51)Int.Cl.

G11B 21/20

B23K 26/00

B23K 26/06

F16F 1/18

(21)Application number : 63-054350

(71)Applicant : FUJITSU LTD

(22)Date of filing : 08.03.1988

(72)Inventor : MATSUSHITA NAOHISA

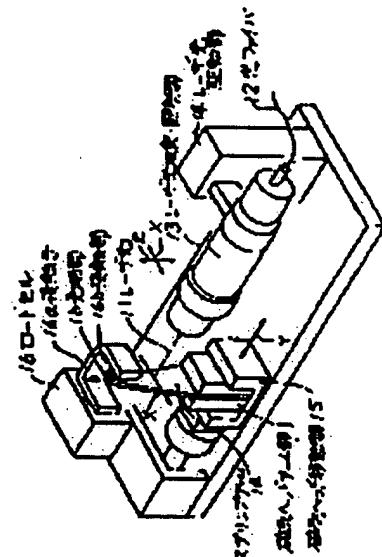
HARADA TADA AKI

## (54) MAGNETIC HEAD FORMING PROCESSING METHOD

(57)Abstract:

PURPOSE: To obtain a stable spring pressure characteristic by radiating a laser beam pulse converged in the neighborhood of a prescribed bending position on the surface of the spring arm of a magnetic head by plural adjacent scanning line.

CONSTITUTION: A magnetic head moving part 15 is fixed in a prescribed position so that a tip part 1b of a magnetic head arm part 1 may not touch an inner surface contact part 16b of a contact shoe 16a of a load cell 16. The moving part 15 is moved in a Y direction, the tip part 1b is brought into contact with a contact part 16b, the moving part 15 is moved by the necessary deformation quantity of the tip part 1b and a clearance is formed. As moving a laser beam converging/radiating part 13 in an X direction by a laser beam driving part 14, a laser beam 11 is emitted and the surface of a spring arm 1a is scanned. Since the arm 1a is bent to an irradiation side on the scanning line of the beam 11, the above-mentioned clearance is narrowed. The irradiation is repeated as moving the beam 11 in a Z direction until the clearance is lost, the tip part 1b touches the contact part 16b and the prescribed spring pressure is obtained, and the desired bending dimension and spring pressure are obtained. Thus, the magnetic head of stable characteristic can be easily supplied for a long period.



CLAIMS

[Claim(s)]

[Claim 1] The process which is the fabricating-operation method of a spring arm of bending to the predetermined field of the spring arm which uses an end as the free end, performing a fabricating operation, and making a predetermined variation rate give this free end, and fixes the other end of a spring arm, the free end of this spring arm -- a variation rate -- the laser beam pulse which the predetermined energy density which can scan a near field crosswise [ this / spring arm ] converged The fabricating-operation method of the spring arm characterized by including \*\*\*\*\* irradiated while shifting only the number of times corresponding to a change necessary [ in the predetermined field of this spring arm / above-mentioned ] in the length direction of this spring arm one by one.

## DETAILED DESCRIPTION

### [Detailed Description of the Invention]

#### [\*\* important point]

It is related with the fabricating-operation method of the spring arm which forms predetermined spring pressure in the spring arm of the magnetic head. It is the fabricating-operation method of a spring arm of bending to the predetermined field of the spring arm which uses an end as the free end for the purpose of improvement in the productivity by easy and precise processing, performing a fabricating operation, and making a predetermined variation rate give this free end. the process which fixes the other end of a spring arm, and the free end of this spring arm -- a variation rate -- the laser beam pulse which the predetermined energy density which can scan a near field crosswise [ this / spring arm ] converged It constitutes including the process irradiated while shifting only the number of times corresponding to a change necessary [ in the predetermined field of this spring arm / above-mentioned ] in the length direction of this spring arm one by one.

### [Industrial Application]

this invention relates to the fabricating-operation method of a spring arm of having started the bending method of the spring arm in the magnetic head etc., especially having performed necessary bending easily and precisely using the laser beam, and having aimed at improvement in productivity.

### [Description of the Prior Art]

A view 3 is drawing showing the spring arm processing method in the conventional magnetic head etc., and the perspective diagram in which (A) shows the bending method, and (B) are drawings which outlined the spring pressure force adjustment method.

Drawing (A) is what showed the method for bending a spring arm to near the necessary value, spring arm 1a which consists of a flat flat spring by about 2 equilateral triangles of the magnetic head arm section 1 is laid on a rubber sheet 2, and it is moved in the direction of B, pressing a roller 3 in the direction of \*\*\*\* A from the upper part further, and shows the state of \*\*\*\*(ing) the above-mentioned spring arm 1a and of R Bending and carrying out as shown in a side elevation.

The variation in the amount of displacement to the initial valve position of magnetic-head 1b located at the nose of cam of spring arm 1a in this state is large.

Moreover, drawing (B) is a process which tunes the amount of displacement of the magnetic-head 1b portion in drawing (A) finely.

R Drawing (A), to near the necessary value, it is the magnetic head arm section bent and carried out, and, drawing, spring arm 1a of 1 is the load cell by which 5 is set to the predetermined position, and the spring pressure drop to which 6 operates with the signal from this load cell 5.

If the magnetic head arm 1 is installed in a predetermined position here, it has composition in which magnetic-head 1b of spring arm 1a presses contact 5a of a load cell 5, and the spring pressure drop 6 displays the contact pressure at that time.

Therefore, when it pressurizes from illustration C and mechanical deformation is given, when the display spring pressure force of the spring pressure drop 6 does not fulfill default value, and the display spring pressure force of the spring pressure drop 6 exceeds default value on the other hand, it is made to satisfy severe contact pressure tolerance like the magnetic head to pressurize from illustration D, give mechanical deformation, and adjust spring pressure.

### [Problem(s) to be Solved by the Invention]

By the fabricating-operation method of the conventional spring arm, while the spring pressure by the expert needed to be tuned finely, there was a problem which says that a man day starts, and there was a problem referred to as that the spring pressure property which the adjusted fabricating-operation portion deformed during the assembly operation after a fabricating operation or use, and was stabilized over the long period of time is not acquired.

### [The means for solving a technical problem]

The process which the above-mentioned trouble is the fabricating-operation method of a spring arm of bending to the predetermined field of the spring arm which uses an end as the free end, performing a fabricating operation, and making a predetermined variation rate give this free end, and fixes the other end of a spring arm, the free end of this spring arm -- a variation rate -- the laser beam pulse which the predetermined energy density which can scan a near

field crosswise [ this / spring arm ] converged. The fabricating-operation method of the spring arm constituted including \* \*\*\*\* irradiated while shifting only the number of times corresponding to a change necessary [ in the predetermined field of this spring arm / above-mentioned ] in the length direction of this spring arm one by one [the object for \* ]. While being hard to take out an exact size generally in the case of the fabricating operation by elastic deformation, a size tends to change with springbacks etc. with time.

Then, in this invention, scan a laser beam near the predetermined position of tabular spring material, the plastic deformation by heating momentary into this scanning portion and cooling is made to cause, it bends, and the fabricating operation is performed.

In this case, since the whole degree of corner of a street when approaching while it was changeable with the energy density of a laser beam, the plastic deformation irreversible deformation of corner of a street, i.e., degree, generated by one scan, and carrying out a multiple-times scan in parallel is proportional to the number of times of a scan, it can make the degree of bending angle, as a result spring pressure agree correctly in a necessary value by setting up beforehand the scanning position and the number of times of a scan of a laser beam which can control energy.

Therefore, the fine-tuning process of spring pressure is unnecessary, and can do the exact bending fabricating-operation work continued and stabilized at the long period of time in a short time.

[Example]

A view 1 is drawing explaining the R bending method by the laser beam, and a view 2 is a schematic diagram showing the example of the spring arm fabricating-operation method of the magnetic head.

10 is a metal plate with a thickness of about 0.5mm, and the view 1 (1) shows the state where the laser beam 11 was made to scan in the direction which crosses the width of face of this metal 10.

For example, if a laser beam 11 is moved in the direction of A with the speed of 20 mm/sec as a pulse of 40 times / sec, the pitch between each irradiation spot will be set to 0.5mm.

In this case, as temperature falls immediately after it and it contracts, although it bends to the rear-face 10b side momentarily [ in order, as for this metal plate 10, to heat rapidly the scanning-line top of the this laser beam 11 of surface 10a first and to expand thermally ], and shown in drawing (2) as a result, it will bend with an angle alpha to the surface 10a side.

Drawing (2) is drawing which only s (for example, about 0.1mm) shifted the scanning line of drawing (1), and scanned the laser beam 11. In this case, since an angle alpha is further bent as shown in drawing (3), the whole knee is set to 2alpha.

Drawing (3) is drawing which only s shifted the scanning line further from drawing (2), and irradiated the laser beam 11, and in this case, as shown in drawing (4), the whole angle of bend is set to 3alpha.

In addition, the above-mentioned degree alpha of corner of a street is changeable with the energy of a laser beam 11.

In this case, the deformation formed of the above-mentioned angle-of-bend 3alpha is shown as a d size drawing (4).

The same work as the following is wound and \*\*\*\*(ed), and necessary angle of bend is secured correctly.

in addition, the move direction of the laser beam 11 in the process after drawing (2) -- A and B -- it is checking that the same effect is acquired in any direction

In a view 2, the optical fiber [ section / head arm / magnetic ] which introduces into this equipment the laser beam from the laser oscillation machine with which one is illustrated and a laser beam and 12 are not illustrated for 11, irradiated laser beam convergence / irradiation section on which 13 converges a laser beam, and 14 this laser beam convergence / irradiation section 13 The upper and lower sides (Z), The magnetic-head move section for moving the laser beam mechanical component driven in the right-and-left (X) direction and the magnetic head arm section 1 to which 15 was fixed in the direction of order (Y), and 16 magnetic-head 1b located at the nose of cam of spring arm 1a of the above-mentioned magnetic head arm section 1 It is the load cell equipped with contactor 16a of the typeface of KO to insert. In process, although the magnetic head arm section 1 is first fixed to the predetermined position of the magnetic-head move section 15, magnetic-head 1b of this magnetic head arm section 1 is fixed in this case, so that inside contact section 16b of contact 16a of a load cell 16 may not be contacted.

Subsequently, after moving the magnetic-head move section 15 in the direction of illustration Y and contacting the above-mentioned magnetic-head 1b and contact section 16b, this magnetic-head move section 15 is moved by d size in the amount of displacement, i.e., the 1st view , (4) which the above-mentioned magnetic-head 1b needs, and the gap of d size is formed between the above-mentioned magnetic-head 1b and contact section 16b.

Moving laser beam convergence / irradiation section 13 set to the predetermined position by the laser beam mechanical

component 14 here in the direction of X, a laser beam 11 is injected and the front face of spring arm 1a is scanned in the direction of X.

In this case, as the 1st view explained, since spring arm 1a is bent on the scanning line of a laser beam 11 at an irradiation side, the above-mentioned gap d is narrowed.

Then, moving a laser beam 11 to a Z direction until this gap d is lost, the above-mentioned magnetic-head 1b and contact section 16b contact and further predetermined spring pressure is obtained, the irradiation was repeated and a necessary bending size and necessary spring pressure are secured.

[Effect of the Invention]

By this invention, the variation rate with which it may be satisfied of severe contact pressure tolerance like the magnetic head can offer the easily realizable fabricating-operation method of a spring arm like \*\*\*\*.

---

## DESCRIPTION OF DRAWINGS

---

**[Brief Description of the Drawings]**

A view 1 is drawing explaining the R bending method by the laser beam.

A view 2 is a schematic diagram showing the example of the fabricating-operation method of a spring arm.

A view 3 is drawing showing the spring arm processing method of the conventional magnetic head.

It comes out. In drawing

1 is the magnetic head arm section.

1a is a spring arm and 1b is the magnetic head.

10 is a metal plate and 10a is a front face.

10b is a rear face.

11 is a laser beam and 12 is an optical fiber.

13 is laser beam convergence / irradiation section.

14 is a laser beam mechanical component.

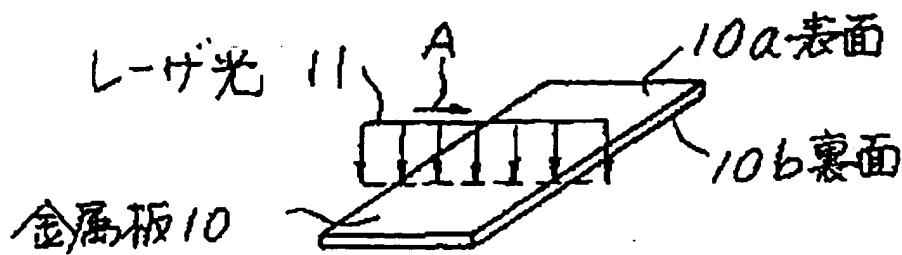
15 is the magnetic-head move section.

16 is a load cell and 16a is contact.

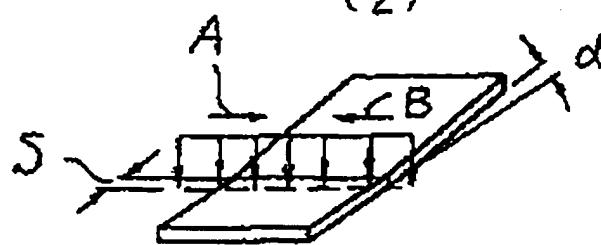
16b is the contact section.

\*\*\*\*\*

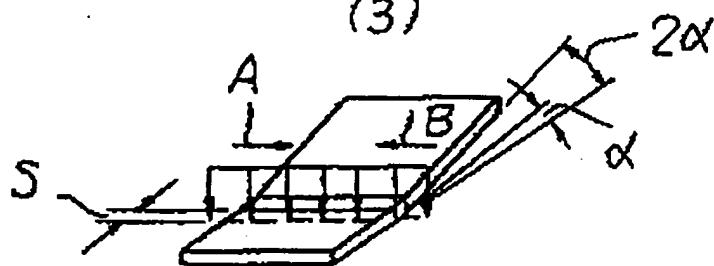
(1)



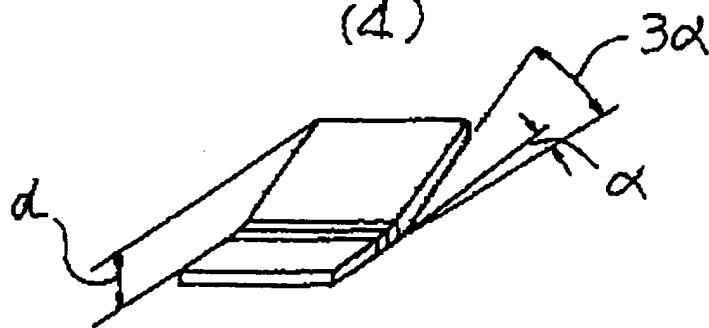
(2)

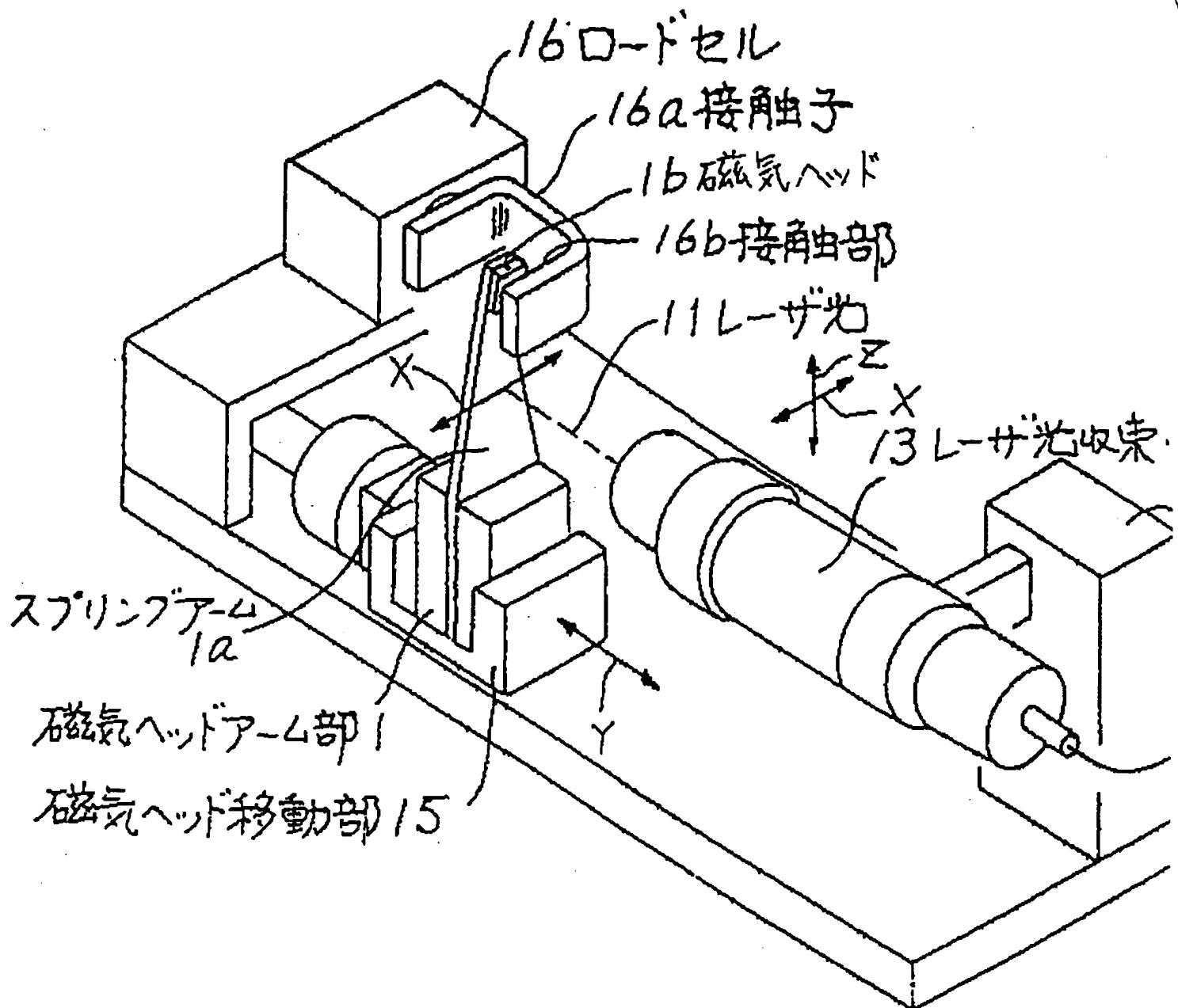


(3)



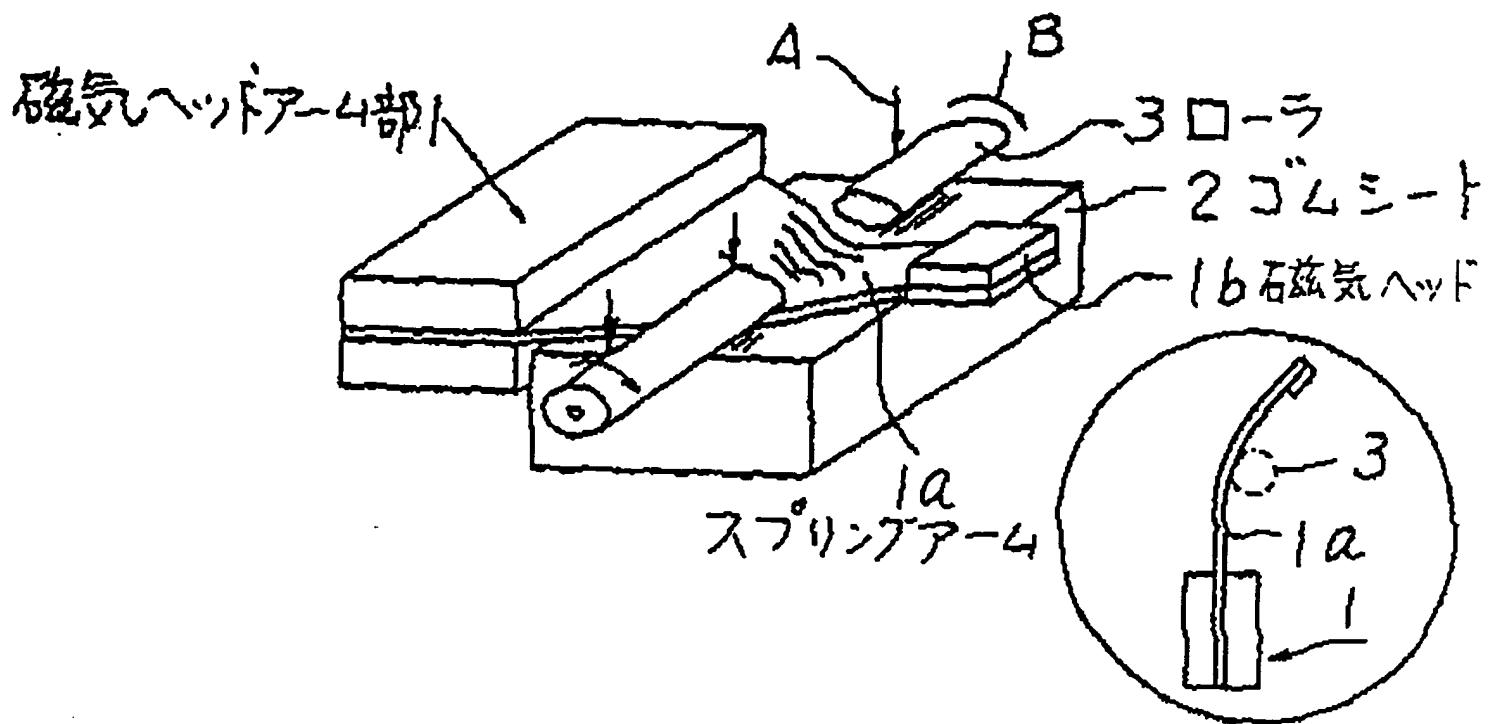
(4)



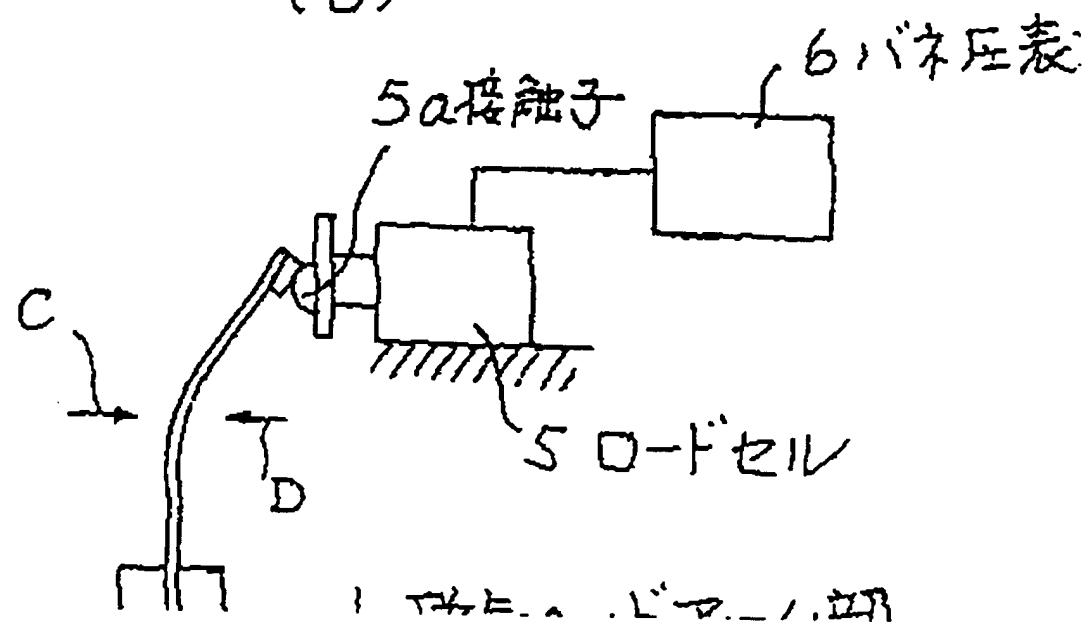


磁気ヘッド成形加工方法を説明する

(A)



(B)



THIS PAGE BLANK (USPTO)